FACT SHEET

(Pursuant to Nevada Administrative Code [NAC] 445A.401)

Permittee Name: **Hycroft Resources & Development, LLC**

Project Name: **Crofoot Heap Leach Facility**

Permit Number: **NEV0060013**

Review Type/Year/Revision: **New Permit/Renewal 2021, Fact Sheet Revision 00**

A. Location and General Description

Location:

The facility is located in southernmost Humboldt County, within Sections 26, 34, and 35, Township 35 North, Range 29 East, Mount Diablo Baseline and Meridian, approximately 50 miles west of Winnemucca, Nevada, near the historic townsite of Sulphur, Nevada, and along the county line between Humboldt and Pershing Counties.

General Description:

Existing facilities include the heap leach facility (HLF) and the High Pregnant Pond. Former Crofoot Heap Leach (Crofoot) facilities - the Low Pregnant Pond, Overflow Pond, and the Brimstone-Crofoot Pipeline, were transferred to the currently active Hycroft Mine Project, Water Pollution Control Permit (WPCP) NEV0094114.

Processing of leach solution was through a Merrill Crowe plant until April 2000. A carbon-in-column system was then installed and operated until 2004.

The Project is located entirely on public lands, encompassing approximately 313 acres, all of which are on unpatented mining claims administered by the Bureau of Land Management, Winnemucca District, Black Rock Field Office. The Project is in permanent closure.

B. Synopsis

Water Pollution Control Permit (Permit) NEV0060013 was first issued to Hycroft Resources & Development, Inc. (HRDI) in April 1988 and expired in August 2001. The site was placed into a closure status in 2004. The 2021 Permit renewal continues with site closure and does not allow any mining or processing and shall remain in effect until 19 August 2026.

In 2007, HRDI become a wholly owned subsidiary of Allied Nevada Gold Corporation. In March 2015, Allied Nevada Gold Corporation declared bankruptcy. In October 2015, Allied Nevada Gold emerged from bankruptcy as HRDI. On 15 October 2020, the Division received a notice of corporate name change that was filed with the Nevada Secretary of State on 18 May 2020. The Permit and Fact Sheet were revised to reflect the new corporate name: Hycroft Resources & Development, LLC (HRDL), the Permittee.
Mining was conducted using conventional open pit mining methods; however, all pits and waste rock dumps associated with the Crofoot Heap are monitored under the Hycroft Mine Project, WPCP NEV0094114. Characterization of waste rock,

overburden and ore for the potential to release pollutants was required by Permit conditions during operations.
Prior to 1996, ore was stage-crushed to minus ¾ inch, lime added for pH control, transported, and stacked via conveyor belt on the Crofoot leach pads. After 1996 all ore placed was run-of-mine (not crushed) with pebble lime directly added into the loaded haul trucks and end-dumped directly on the pad by haul truck. Lime addition was at a rate of 1 to 4 pounds of lime per ton of ore.

Material was added to the heap in lifts varying from 20 – 30 feet (ft.) in height. Following placement, the ore was irrigated with a dilute sodium cyanide solution by means of drip lines, wobblers and/or sprinklers. Depending upon precious metal concentration, the solution was routed to either the High Pregnant (HP) or Low Pregnant (LP) Ponds and then pumped to the Merrill-Crowe plant for stripping (HP solution) or recirculation back to the heap (LP solution). Loaded zinc, from the Merrill Crowe plant, was then retorted to remove and recover mercury, and smelted to produce gold/silver doré bars. Both the doré and liquid metallic mercury were shipped and sold off-site.

Site Closure Plan:

Placement of ore on the Crofoot HLF ceased in 2001. Until 2004, heap draindown solutions were recirculated to the heap following recovery of precious metals through a carbon-in-column circuit. The HLF facility was placed in permanent closure in 2004. The Final Plan for Permanent Closure (FPPC) was submitted in July 2009 and included sections describing the closure of the HLF and the refinery and related facilities, i.e., barren and settling ponds. Following multiple modifications to the proposed closure plan, the refinery section of the FPPC was approved on 16 March 2010. Following the submittal and subsequent Nevada Division of Environmental Protection (Division) approval of an engineering design change (EDC) for the modification of the HLF channels, the HLF section of the FPPC was approved on 20 March 2012. The final as-built report was received in January 2015 and accepted by the Division in December 2015. The 2017 FPPC Update, dated 10 February, was reviewed by the Division, and subsequently approved with technical comments. An update to the FPPC will be required as part of a Schedule of Compliance Item (SOC) I.B.1. in the 2021 Revision 00 WPCP.

Site Lithology/Stratigraphy:

The Crofoot Heap Leach Facility is located on the southern edge of the Black Rock Desert along the western flank of the Kamma Mountains. The Kamma Mountains are a typical north-northeast-trending range of the Basin and Range Physiographic Province.

The oldest rocks exposed in the Project area are the Tertiary Kamma Mountains Volcanics. These rocks include flows, dikes, sills, tuffs, volcaniclastic sediments and breccias. The volcanic rocks vary in composition form rhyolite to latite. The total thickness of this unit is unknown in the Project area, however, measurements in nearby Rosebud Canyon suggest a minimum of 6,000 feet at that location.

A fault contact separates the Kamma Volcanics from the Upper Tertiary to Lower Quaternary Camel Conglomerate. This unit is a poorly sorted, thickly bedded, sub-angular to sub-rounded conglomerate. Based upon drilling, the total thickness of the Camel Conglomerate is over 800 feet. The Camel Conglomerate is the host rock for the Crofoot ore deposit and hydrothermal alteration varies from intense silicification to argillization.

Quaternary unconsolidated lake sediments and alluvium are found as a thin veneer over the Camel Conglomerate with thicker accumulations along fault scarps and in washes. In the area of the Crofoot leach pads and ponds, west of the ore deposit, these sediments are dominated by a large flat-lying lenticular clay deposit, probably derived from the argillically altered Camel Conglomerate. This clay deposit, as defined by surface exposure and condemnation drilling, is over 250 feet thick beneath the Crofoot leaching/processing facilities. The clay has been utilized by the Permittee as the primary liner for the clay leach pad and subbase construction.

The Crofoot heap leach facilities are underlain by unconsolidated Quaternary alluvium and Lahonton Lake sediments dominated by a large flat-lying gravelly clay deposit. The clay layer is at least 180 feet thick and extends laterally beneath all of the Crofoot heap leach facilities. The clay unit is relatively homogenous with only minor changes in gravel and/or total clay content. The clay is often blue in color and has a high plasticity. Overlying the clay deposit are alluvial sands and gravels. Depth to the alluvium/clay contact varies from 10 to 55 feet below ground surface (bgs) in the area west of the Crofoot Heap Leach Facility. At the base of the leach pads, the alluvium has an average thickness of 50 feet but thins rapidly to the west and disappears entirely within 1,500 feet laterally from the downgradient (western) boundary of the heap leach pads.

Structural Geology and Mineralization:

The structural geology of the Crofoot Project area is dominated by a series of steep, west-dipping, normal faults herein designated as the Range Front Fault, the Central Fault, and the East Fault. The East Fault lies approximately 1 mile to the east of, and roughly parallel to the Central Fault. The Central Fault does not form a contact between different geologic units; rather it is defined by a linear topographic irregularity.

The Range Front Fault separates the Quaternary alluvial fill of the Black Rock Desert to the west from the Camel Conglomerates to the east. The downward subsidence of the western fault block over time may account for the substantial thickness of the clay deposit described above.

The mineralization is an epithermal vein deposit, hosted in rocks of the Sulphur Group (aphanitic volcanic rocks, agglomerate) and the Camel Conglomerate. The ore body is disseminated, blanket in form with a length of approximately 2.75 miles, strikes northeast and dips steeply to the northwest. Controls for ore emplacement included structural and host-rock permeability. The north-northeast-trending central fault zone and related splays are mineralized continuously over a distance of 2.5 miles. The system is enriched in silver southward and with depth, e.g. silver: gold ratios of 4:1 to 10:1. Base metals increase with depth and arsenic, antimony, and mercury decrease with depth. The system is high in selenium.

There are two major types of alteration recognized at Sulphur: solfataric near-surface alteration by hot water, gases, and acids, and silica-pyrite-alunite alteration characterized by dense siliceous flooding accompanied by fine-grained sulfides, formed at moderate depth. Alteration varies from intense silica-adularia-pyrite to weak propylitic with a widespread cap of late "acid-leach alteration," which appears to have descended along pre-existing structures.

Pits:

The bulk of the ore (66 million tons) hauled to the Crofoot leach pads originated at the Central Fault open pit complex, which included the Bay Area, South Central, Boneyard, Gap, and Cut 4 open pits. Mining methods consisted of conventional drill and blast mining techniques employing excavators and off-highway haulage trucks.

In 1997 and early 1998, an additional 5 million tons of run-of-mine material were transported from the Brimstone deposit, an ore body located on another main fault in the area and from the East fault to the Crofoot site. This was the last ore to be placed on the Crofoot heap leach pads.

Waste Rock Dumps:

All Crofoot waste rock dumps were mined out during the Brimstone expansion through mid-2015.

The pits and waste rock dumps are monitored under the Hycroft Mine Project, WPCP NEV0094114, formerly known as the Brimstone Mine. The information is included in this fact sheet for completeness of the Permit only. Pits and waste rock dumps are not monitored by this Permit.

Heap Leach Pads:

The Crofoot heap leach pad consists of four individual leach pad phases, Pads 1, 2, 3, and the In-fill (or Slot Pad), which are all combined into a single composite pad. The leach pad encompasses an area of approximately 14.3 million square feet, contains approximately 70.8 million tons of ore consisting of 46 million tons of crushed ore and 24.8 million tons of run-of-mine ore, with heights ranging from 30 feet at the southern side of Pad 3 to 205 feet at one location on Pad 1.

Leach Pad 1 encompasses a rectangular area of approximately 3,000 x 1,500 feet and is subdivided into fifteen 200-foot x 1,500-foot panels that gravity drain to fourteen weir boxes. The leach pad base is composed of a 1-foot thick, compacted clay base having an as-built permeability coefficient of 1 x 10^{-6} cm/sec. The clay base was applied in two 6-inch lifts over re-contoured, compacted native soil subbase. Internal berms, ditches and perforated high-density polyethylene (HDPE) drainage pipes were installed over the base. Perforated pipe was placed over a layer of 4-ounce geotextile and 30-mil polyvinyl chloride (PVC) liner within the ditch network. No leak detection system was constructed beneath the external solution trenches.

Leach Pad 1 contains approximately 15 million tons of crushed ore and approximately 7.5 million tons of run-of-mine material. The average height is 150 feet and the maximum height is 200 feet.

Leach Pad 2 encompasses an area of approximately 4.8 million square feet, sub-divided into sixteen 200-foot x 3,000-foot cells that drained to 15 weir boxes. These weirs were later removed and replaced with HDPE liner and pipe by 2013. Leach pad liner construction was similar to Pad 1 above except that the permeability of the clay was 1 x 10^{-7} cm/sec, which meets Division minimum design criteria for a soil liner, and a leak detection system beneath external solution trenches.

Approximately 17.75 million tons of crushed ore and 11.5 million tons of run-of-mine ore were placed on Pad 2. Average heap height is 175 feet and maximum height is 205 feet.

Leach Pad 3 encompasses an area of approximately 5 million square feet, sub-divided into seventeen 200-foot x 1,500-foot cells, which drained to sixteen weir boxes. Leach pad liner construction and channel leak detection system construction are similar to Leach Pad 2, except that internal leach pad channels were upgraded from PVC to HDPE and a portion of the soil liner was amended with bentonite to achieve the required maximum permeability of 1 x 10^{-7} cm/sec.

Leach Pad 3 contains approximately 13.25 million tons of crushed ore and 5.8 million tons of run-of-mine ore. The average heap height is 75 feet and the maximum heap height is 175 feet.

The In-Fill, or Slot-Cut, leach pad is constructed between Pad 1 and Pad 2. This area had originally been left open to accommodate a drainage channel. Prior to construction, a pair of 18-inch diameter NP12 advance drainage systems. PVC plastic drainpipes were installed and a narrow leach pad was constructed over the site. The construction methods, materials and specifications were identical to those for Leach Pad 3 with native clay amended with bentonite to achieve the 1 x 10^{-7} cm/sec permeability.

On 11 June 2021 the Division electronically received an EDC titled 'Engineering Design Change: Spent Crofoot Ore Used as Blasthole Stemming' that proposed using spent ore located on the HLF as blasthole stemming for work at Hycroft Mine Project (NEV0094114). Material that originated from the Hycroft Mine Project did not work well as stemming material. The Division approved the EDC on 1 July 2021 with three conditions. 1)A maximum of 1,500 tons of spent ore per 1.8 million tons of waste rock may be removed from Crofoot for use at Hycroft Mine; 2) Removal of the spent ore at the Hycroft Mine Project shall not interfere with the closure and scheduling to close the Crofoot HLF; and, 3) Approval is valid until 31 December 2024. The Hycroft Mine (NEV0094114) blasts and hauls approximately 1.8 million tons of rock every month; 1,500 tons of that 1.8 million tons may originate from the Crofoot HLF. The ratio of 0.083 percent may not be exceeded in any one month.

Process Ponds:

Of the original five process ponds constructed for the Crofoot leach pad, only the High-Grade Pregnant Pond remains directly associated with the Crofoot pads. With the 2017 Permit renewal, to eliminate potential confusion with other nearby process ponds, the High Pregnant Pond was renamed as the Crofoot Pond. Of the four other process ponds, the Low-Grade Pregnant Pond and Emergency Overflow Ponds were transferred to the Hycroft Mine Project (Brimstone) Water Pollution Control Permit, NEV0094114. With the approval of the December 2009 Brimstone EDC, the Diatomaceous Earth Settling Pond and Barren Pond were permanently closed in-place.

Beneath and extending to the west of the Crofoot Pond and Low-Grade Pregnant Pond, a French drain was constructed to allow drainage of groundwater encountered below the clay layer. The outflow, identified as the French Drain Outlet (FDO), is monitored weekly for flow and quarterly for Division Profile I parameters, with constituent concentrations generally being below Division Profile I reference values except for occasional exceedances for fluoride, manganese, sulfate, and total dissolved solids (TDS). Solution from the FDO is pumped into the Crofoot Pond.

The Crofoot Pond has dimensions measuring 415 feet x 415 feet by 15 feet and a maximum capacity of 13 million gallons. An EDC was submitted in November 2009 to reconstruct the Crofoot Pond and leak detection system. The Division approved the EDC in December 2009. The pond was relined using 80-mil primary and 60-mil secondary HDPE liners with geonet in between, draining to a leakage collection and recovery sump (LCRS) having a design capacity of 330 gallons. Geonet is a geosynthetic material consisting of integrally connected parallel sets of ribs overlying similar sets at various angles for drainage of liquids or gases. The final as-builts were submitted and approved by the Division in December 2010.

Heap Leach Pad Closure:

The approved FPPC for the Crofoot pads consists of rebuilding the draindown collection system and solution channels and regrading the heap side slopes from the existing angles to a 2:1 horizontal:vertical (H:V) on Pad 1 to 3:1 on Pad 3. No regrading of the heap has occurred to date; the Crofoot Pond and heap solution collection channels have been rebuilt.

The 2017 Permit renewal included a schedule of compliance item to submit an updated FPPC, with implementation timeline, for the permanent closure of the HLF. An updated FPPC was submitted in November 2017 and was approved by the Division with technical comments. In the 2021 Renewal, Rev 00, SOC item I.B.5 was included for an updated FPPC which shall include a schedule for the implementation and completion of the permanent closure of the Crofoot Heap Leach Facility. This FPPC will include an updated stormwater management plan to prepare structures to handle 500-year 24-hour storm events. The updated FPPC shall address over dumping that took place on Pad 1, the material being removed from the heap to be used for blasting hole stemming at Hycroft Mine Project (NEV0094114), and a schedule for regarding the HLF.

Solution Ditches and Leak Detection Systems:

The solution ditch for the north two-thirds of Leach Pad 1 is constructed with three layers consisting of 1-foot of compacted clayey-soil, overlain by a layer of 36-mil “Dynaloy”, and further overlain by the primary 60-mil HDPE liner.

The solution ditch for the southern one-third of Pad 1 and all of Pad 2 consists of a 60-mil HDPE primary liner overlying a compacted clay subbase with a leak detection geonet layer between the primary liner and the subbase. This leak detection system daylighted at the High Pregnant Pond. This leak detection design is no longer considered reliable by the Division.

Solution from Leach Pad 3 flowed into two 15-inch diameter PVC pipes located in a single-lined HDPE ditch. The liner is placed on a compacted clay layer having a permeability of less than 1 x 10^{-7} cm/sec. The leak detection system consists of a 2-inch diameter perforated PVC pipe embedded in a 6-inch deep, sand-filled channel below the entire length of the ditch. The leak detection pipe daylighted at the juncture of Pad 2.

Beginning in 2011, per a Division approved EDC, the HLF solution channel was reconstructed, and portions relined. Closure activities consisted of removal of the existing piping in the channel, the cleaning, inspection and repair of the existing 60-mil HDPE liner, and backfill and compaction of select fill within the western portion of the existing dual channels. Two-inch diameter perforated pipe was then installed between the existing 60-mil smooth HDPE and the new 80-mil HDPE Drain Liner; these pipes, identified as Pad 1 Launder LCRS (SDLDP-1) and Pad 2/3 Launder LCRS (SDLDP-2), replaced the older solution ditch leak detection port (SDLDP). A 4-inch diameter perforated corrugated polyethylene (CPE) pipe was placed on top of the 80-mil HDPE Drain Liner to capture and direct heap draindown to the draindown distribution box. However, following review of the 2013 Record of Construction, it was discovered that new 60-mil HDPE liner was only installed in the new draindown conveyance channel located between the draindown collection drain and the Crofoot Pond and at the removed concrete and metal weir boxes – new 60-mil HDPE liner was not installed throughout the solution draindown channel as originally proposed and approved.

Two previously unknown leak detection ports were discovered during the 2018 inspection. The ports monitor leakage for Pad 3A and Pad 3B and identified as CLD1 and CLD 2, respectively; these ports were added to Part I.D.1 in the 2018 Permit Revision 01.

Originally, draindown solution reported to the channel through a series of concrete and metal weir boxes. Due to the weir boxes being in too poor condition to fasten HDPE liner directly to the weirs, an EDC was submitted for removal of the weir boxes with anchoring of the liner into the existing clay liner to allow solution to gravity flow into the channel. The Division approved the EDC in August 2012.

The weirs, located on the eastern edge of the internal channel, were removed and replaced by a geosynthetic clay layer (GCL) and then overlain by a double-lined 80-mil HDPE system. The entire channel was then filled with drain gravel and overlain with geotextile. Spent ore was placed over the geotextile.

Beginning in the second quarter of 2015, leak detection flow rates in the SDLDP reached a high of 438 gallons per day (gpd) and then decreased slightly to 190 gpd in the third quarter of 2016. In early 2016, the Division required the Permittee to investigate the increase in flow. The Permittee determined that the increase was due to the higher-than-normal precipitation levels beginning in Spring 2015. In addition, since the solution channels were recently relined, the Permittee petitioned to change the terminology and description of the SDLDP function and eliminate the SDLDP Permit limits and monitoring requirements. This request was denied by the Division.

The Division included a schedule of compliance item in the 2017 Permit renewal that requires the Permittee to submit a corrective action plan that includes an implementation schedule to investigate, locate the source of leakage, and repair any damage to the heap leach pad drainage channel. SOC item I.B.1 of Revision 00 of the 2021 Permit renewal, states that the Permittee shall submit an Engineering Design Report (EDR) detailing the findings of the excavation of the heap leach pad drainage channel. In addition, SOC item I.B.3, states the permittee shall submit an EDC that reflects any updates to the monitoring plan as a result of findings made to fulfill SOC item I.B.1. The renewal also includes SOC item I.B.4, which states the Permittee shall submit an evaluation of the overall heap leach channel collection system, specifically the channel leak detection and monitoring pipes. At the time of Permit renewal, investigations into the channel were still on going. Leakage rates at SDLDP-1 and SDLDP-2 were 66.40 and 65.60 gpd, respectively, continuing to exceed the permitted average yearly limit of 10 gpd.

Crofoot Refinery, Barren Pond and Settling Pond:

Closure of the refinery and associated facilities commenced in June 2010 per the 16 March 2010 approved FPPC. The closure program for the various facilities consisted of material characterization and waste determination, waste removal and disposal, decontamination, structure and equipment removal, and facility closure.

HRDI conducted a materials characterization and waste determination program that consisted of identifying, and then sampling materials to be removed during decommissioning activities; finally analyzing those materials for the presence of specific constituents to determine the appropriate management methodology. All non-hazardous wastes were either managed on-site, where possible, or in an off-site landfill, as necessary. On-site management included disposal in the landfill, placement on heap leach facilities, and placement in the bioremediation cells, as appropriate. Off-site management included shipment to designated landfills, recycling, and salvage, as appropriate. All hazardous waste was transported off-site to a licensed treatment, storage and disposal facility for treatment or disposal as necessary.

HRDI chose to maintain the refinery building for future mining operations. It is currently utilized as a maintenance shop.

Closure of the Barren and Diatomaceous Earth Settling Ponds commenced in June 2010. Closure consisted of management of the residual sludge. Sediments remaining in the bottoms of the Barren and Settling Ponds were excavated and placed on the Brimstone HLF for processing. The liners were then cut from the anchor trench and folded into the bottoms of the ponds exposing sub-liner soils. Sub-liner soils were sampled and tested; impacted soils were excavated and also placed on the Brimstone HLF. Once it was determined that no impacted soils remained, the pond areas were backfilled with alluvium and waste rock. The backfilled areas were compacted and graded to promote runoff and accommodate future construction. The area is currently being used as a laydown area.

For specific details, see SRK Consulting (U.S.), Inc. report entitled "Final Closure Report for the Crofoot Refinery, Barren Pond and Settling Pond at the Hycroft Mine," dated 31 May 2016, and approved by the Division on 25 October 2016.

C. <u>Receiving Water Characteristics</u>

The Crofoot heap leach facilities are located on the eastern edge of the Black Rock Desert. There are no surface streams, rivers, or lakes in the immediate vicinity. Given that the groundwater quality downgradient from the mining operation exceeds 10,000 milligrams per liter (mg/L) in TDS (SP-23 and SP-24), that there are no human water supply wells within a 10-mile radius downgradient from the mine and that there is no groundwater exploitation potential for industrial or agricultural uses, it is unlikely that groundwater quality poses a risk to human health.

Surface waters in the vicinity of the Project occur in man-made excavations in a near surface clay deposit, and within numerous intermittent streams on the west flank of the Kamma range. These streams flow only during major precipitation events.

Shallow groundwater underlying the site occurs within alluvial sands and gravels located above the underlying clay layer. The alluvium/clay contact slopes to the northwest and perched water that accumulates at this interface flows west toward the playa and evaporates at the surface where the wedge of alluvium terminates. The shallow groundwater system consists of a mixture of naturally occurring waters of varying alkalinity, salinity, and major and minor trace element chemistry, i.e. elevated concentrations of arsenic, boron, chloride, fluoride, manganese, selenium, sodium, and sulfate.

The geochemistry of the groundwater is influenced by geothermal activity that is common in the area and was the source of mineralizing fluids responsible for the ore deposit, which is classified as a hot spring-type gold and silver deposit. The influence of geothermal activity on the shallow groundwater system is described below.

Groundwater conditions underlying the Crofoot heap leach facilities are monitored and characterized by: 1) spring boxes and clay ponds; 2) compliance and shallow monitoring wells; and 3) the French drain outlet.

Spring Boxes #1A, #1B, #1C, and #2, are shallow man-made wells that penetrate the clay deposit and are recharged by flow along the alluvial gravel/clay contact and by seepage of waters entrained within the surrounding clay body. It is estimated that these spring boxes were constructed in the late 1800s to develop geothermal resources related to geothermal activity that is common in the Black Rock Desert area.

The water chemistry from these spring boxes has been monitored since 1993 as part of the WPCP monitoring program. There are three locations related to Spring Box #1: Spring Box #1C (SB1C), Spring Box #1A (SB1A), and Spring Box #1B (SB1B). Historically it is unclear which of the three locations was monitored for a given quarter over the monitoring period. Chemistry results for SB1C are sufficiently different from those observed in SB1A and SB1B and the results from this location can be differentiated from the other spring box data in the historic database. The chemistry for SB1A and SB1B are similar enough that they cannot be distinguished from each other. Therefore, the data collected for the Spring Box #1 area can be separated into two separate points: Spring Box #1A, B (SB1AB, consisting of data from SB1A and SB1B) and SB1C.

In SB1AB, fluoride and TDS are the only constituents consistently elevated above Division Profile I reference values. Sulfate concentrations are also elevated in this location but are generally below the Division Profile I reference value of 500 mg/L throughout the monitoring period. The pH values are alkaline (i.e., around pH 8 [SU]) and total alkalinity concentrations are consistently high and average 1,200 mg/L. Elevated concentrations of boron and fluoride in this location are attributed to geothermal influences.

The chemistry for the SB1C also shows sodium as the main cation but with no dominant anion (i.e., mixed anions). Arsenic, chloride, fluoride and sulfate are above the respective Division Profile I reference values and sodium and alkalinity are above 2,000 mg/L. At this location, samples are collected from standing water in a 15-foot-long trench by 5-foot wide that collects groundwater. As a result, the high concentrations of arsenic, chloride, fluoride, and sulfate reported for SB1C are attributed to the evapoconcentration of these elements within the spring box trench over time. This is supported by evidence of high evaporation loss in the area including salt crust development on the timbers surrounding the trench.

Spring Box #2, (SB2, aka Sulfur Spring), issues from a man-made timber-framed excavation. This spring is located immediately west of the Crofoot HLF and is a monitoring location for Pad 2 of the Crofoot HLF. Samples are collected from an open-ended steel pipe located within the timber-framed excavation that is about 5 feet in diameter. Water flow from the pipe is to the west and disappears into alluvial gravel within a few hundred feet of the source.

The chemistry record for SB2 is similar to SB1AB and the elevated constituent concentrations in the perched groundwater can be attributed to the influences of geothermal activity. Comparison of the major ion chemistry for SB1AB and SB2 is similar and classified as sodium-bicarbonate dominated water. Constituents that can be directly attributed to process solution, such as weak acid dissociable (WAD) cyanide and mercury are consistently below laboratory method detection limits in SB1AB and SB2. Nitrate is also generally absent in this location and concentrations are generally near or below the laboratory method detection limit.

The clay ponds have formed as a result of water collecting in several depressions that were created during excavation of the clay borrow material for construction of the leach pad subbase. These ponds are perennial and contain water throughout the year. The water is recharged by groundwater flowing along the contact between coarse alluvium and clay. As site conditions are very arid with low annual precipitation (7.7 inches/year) and high evaporation rates (57 inches/year), the clay pond water typically shows increased constituent concentrations, particularly of sulfate, chloride, fluoride, and consequently, TDS.

Review and evaluation of the hydrogeochemical data available for these surface water monitoring points allow for the definition of chemical characteristics of the different water types downgradient of the Crofoot HLF and the evaluation of potential impacts from process solution from the HLF. From the data evaluation, the influence of geothermal activity on water quality is evident in the shallow perched groundwater adjacent to the heap as measured by the spring boxes. The main indicators of a geothermal system in the area include elevated levels of boron, chloride, fluoride, manganese, and sulfate.

Groundwater in the Crofoot Project area is found in a shallow ‘perched’ zone associated with the clay deposit mentioned above. Although this shallow groundwater is of good quality, the limited areal extent and the extremely low permeability of the clay aquifer preclude its use as a domestic or industrial water supply.

Since water sampled at SB1A and SB1C is stagnant and non-flowing, water quality at these monitoring points is not representative of the shallow groundwater and were removed as monitoring points from the WPCP with the 2017 renewal. As described above, since SB1A and SB1B (SB1AB) chemistry is similar to that of SB2, only monitoring on a semi-annual basis of SB2 was required in the 2017 renewal.

Two monitoring wells, MW-1 and MW-2 were installed in 1994 to monitor chemistry and water elevations in the alluvial groundwater adjacent to the southern portion of the western boundary of the Crofoot HLF. MW-1 depth to groundwater is approximately 13 feet bgs and has not changed significantly over the 15-year monitoring period. The well is located immediately downgradient and west of the midpoint of Pad 3 of the Crofoot HLF and records the highest groundwater elevation along the western boundary of the heap, apparently controlled by the alluvium/clay interface in this area. Recent water quality data are consistent with historical trends which indicate exceedances of Division Profile I reference values (RVs) for fluoride, iron, manganese, sulfate, and TDS. In addition, no significant change in the concentrations of these constituents has occurred over the same timeframe. No constituents that are unique to the heap process solution are present; therefore, the elevated constituents can be attributed to geothermal activity.

MW-2 is located about 2,500 feet south of MW-1 and west and downgradient of the southern portion of Pad #3. Depth to groundwater averages 35 feet bgs. The only constituent that is currently above Division Profile I RVs is manganese. Data for MW-2 differ from MW-1 with lower pH and TDS concentrations. Geothermal indicators are generally absent in MW-2. As with MW-1, there are no constituents present that are unique to the heap process solution.

Due the saturated nature of the underlying sediments, a French drain was constructed beneath the High Pregnant Pond and Low Pregnant Pond to dewater the areas and prevent the pond liners from floating. The French drain consists of a series of parallel, gravel-filled trenches that transfer groundwater flow to the FDO, located several hundred feet to the west of the ponds. Groundwater is pumped from the FDO to the Crofoot Pond.

In January 2003, the Division directed Hycroft to investigate the source(s) and extent of contamination in the area of the process ponds and the FDO. Based on results of the preliminary investigation, it was concluded that water chemistry for the FDO indicated detectable amounts of WAD cyanide, elevated levels of mercury, selenium, and nitrate, and that a plume of process solution was present in the area of the process ponds.

In February 2003, 11 trenches were excavated in and around the pad and ponds and analytical data on samples collected from these excavations was provided. The water quality data showed elevated levels of chloride, fluoride, manganese, nitrate, selenium, sulfate, TDS, and low levels of WAD cyanide. HRDI began to investigate potential sources of contamination and implement steps to correct suspected sources. Solution flows were reconfigured from crossover ditches into pipes leading from the pad ditches into the Low Pregnant Solution Pond.

During June and July of 2003, HRDI excavated another series of shallow trenches west and north of the Crofoot ponds to further delineate the extent of contamination. Samples were collected from the pits and indicated similar water quality. Additionally, HRDI continues to investigate potential sources of contamination. Excavations at the toe of Leach Pad 1 showed that there was an area adjacent to Leach Pad 1 return ditches where process solution was collecting on the clay pad subbase. These investigations also showed that several weir boxes feeding into the pad collection ditches had deteriorated and may have been leaking process solution into the subsurface. Corrective actions were taken at that time to eliminate the collection of solution on the liner and to lower the invert elevations of the weir boxes to drain solutions off the liner without pooling.

In November 2003, during a Division site inspection, preliminary sampling points were identified, and a groundwater sampling and monitoring plan was developed. In conjunction with the existing groundwater monitoring locations, FDO, MW#1, MW#2, and Spring Boxes 1 and 2, an additional 15 groundwater monitoring wells were installed in April 2004. Monitoring wells SP17 through SP25, and SP28/28A through SP31were installed downgradient of the trenches; SP26 and SP27 were installed in or very close to two of the trenches.

Figure 1, Table 1, and Table 2 below provide location and well construction details, respectively, for each of the SP wells.

Table 1 – SP well location and location relevance.

Monitoring Point	Location		Justification
	Easting	Northing	
SP-17	356416.10	4526551.70	Southern delineation location
SP-18	356237.50	4526772.90	Western delineation location
SP-19	356256.40	4526836.90	Western delineation location
SP-20	356307.40	4526900.30	Western delineation location
SP-21	356341.50	4527006.30	Western delineation location
SP-22	356414.80	4527134.80	Northwestern delineation location
SP-23	356486.00	4527154.50	Northern delineation location
SP-24	356592.40	4527121.30	Northern delineation location
SP-25	356811.70	4527001.60	Northern background
SP-26	356598.70	4526622.60	Source area
SP-27	356559.10	4526582.20	Source area
SP-28A	356489.10	4526449.20	Southeastern background
SP-29	356413.90	4526307.40	Southeastern background
SP-30	356453.40	4526820.90	Central delineation for constituent concentration gradient
SP-31	356214.90	4526741.10	Western delineation location

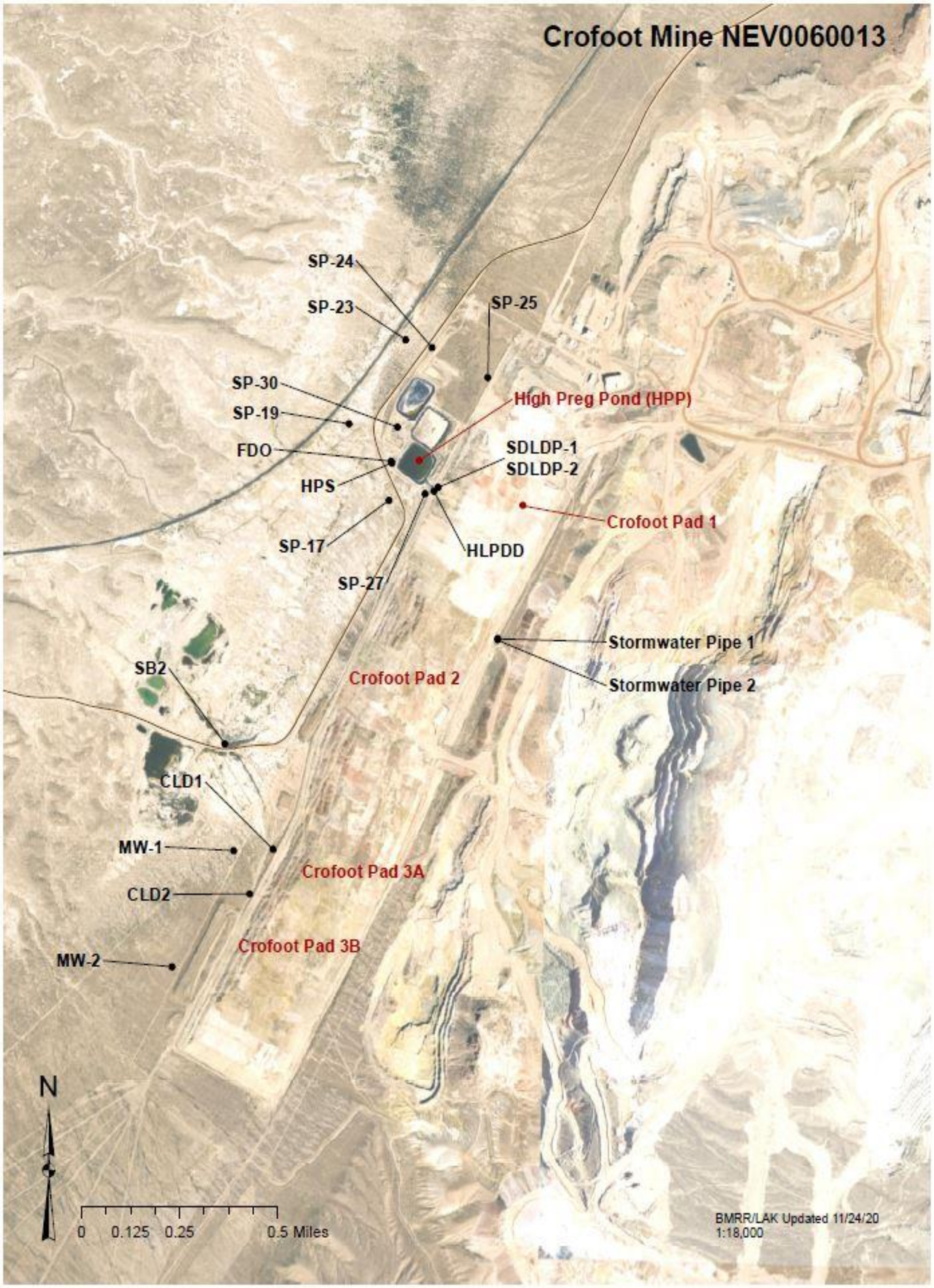

Figure 1 – Crofoot Heap Leach Pad and SP well location(s).

Table 2 – Well construction details.

Well I.D.	Collar Elevation (ft. AMSL)	Total Depth (ft.)	Well Bottom (ft. AMSL)	Depth to water (ft. below collar)	Groundwater Elevation (ft. AMSL)	Screen Interval (ft. below collar)
SP-17	4,107.86	15	4,092.86	5.43	4,102.43	5 - 15
SP-18	4,090.74	15	4,075.74	5.04	4,085.70	10 - 15
SP-19	4,090.60	15	4,075.60	4.24	4,086.36	10 - 15
SP-20	4,093.03	20	4,073.03	5.31	4,087.72	10 - 20
SP-21	4,091.35	15	4,076.35	3.83	4,087.52	5 - 15
SP-22	4,092.52	17.5	4,075.02	5.71	4,086.81	7.5 - 17.5
SP-23	4,095.81	20	4,075.81	9.02	4,086.79	10 - 20
SP-24	4,107.4	20	4,087.4	18.88	4,088.52	15 - 20
SP-25	4,143.4	55	4,088.5	50.56	4,083.84	45 - 55
SP-26	4,124.9	35	4,089.9	18.32	4,106.58	20 - 35
SP-27	4,119.4	20	4,099.4	12.41	4,106.99	10 - 20
SP-28A	4,117.87	20	4,097.87	6.67	4,111.20	10 - 20
SP-29	4,120.84	10	4,110.84	7.17	4,113.67	5 - 10
SP-30	4,104.46	20	4,084.46	10.83	4,093.63	10 - 20
SP-31	4,090.50	15	4,075.50	3.21	4,087.29	5 - 15

The shallow groundwater system immediately downgradient of the Crofoot HLF consists of a mixture of several types of naturally occurring waters of varying alkalinity, salinity, and major and trace element chemistry. The shallow groundwater system is influenced by several natural factors including a geothermal system, the leaching of salts that have accumulated along the edge of the playa, and evapoconcentration. The elevated concentrations of boron, chloride, fluoride, manganese, and sulfate can be directly attributed to the geothermal system. Leaching of the playa salts also contributes to the chloride and sodium concentrations, and evapoconcentration results in an increase in arsenic, chloride, fluoride, and sulfate.

Historic losses of process solutions from the Crofoot HLF have been documented and reported to the Division. However, detecting a loss of process solution from the HLF is complicated by the background chemistry of the groundwater as described above. Constituents that are typically useful in identifying process solution include chloride, mercury, nitrate, selenium, sulfate, and WAD cyanide. However, chloride and sulfate are naturally elevated in the groundwater due to geothermal influences and arsenic, selenium, and sodium are naturally elevated due to the influences from the nearby playa. Therefore, the only constituents that are unique to the HLF process solution are mercury, nitrate, and WAD cyanide. As these constituents would not be expected to occur at significant concentrations in background water, these constituents can be used to document the historic loss of process solution.

Initial sampling performed in April 2004 indicated that various constituents of concern exceeded Division Profile I RVs at various sampling points, (e.g., selenium at SP-27 and SP-30), WAD cyanide (SP-18 and SP-28), mercury (SP-25 and SP-30), and nitrate (SP-30). Although SP-30 showed exceedances for selenium (1.9 mg/L), mercury (0.017 mg/L), and nitrate (18 mg/L), cyanide was at less than detectable levels (<0.005 mg/L).

During the fourth quarter of 2016, the influence of process solution is still evident in shallow investigation wells SP-25 and SP-30. Well SP-25 shows concentrations of mercury at 0.04 mg/L and nitrate at 13 mg/L, and well SP-30 has mercury concentrations of 0.012 mg/L. Of the 15 SP wells, only four wells - wells SP-22, -23, -24, and -25, occasionally indicate trace levels of WAD cyanide, ranging from 0.011 to 0.098 mg/L, but below the Division Profile I RV of 0.2 mg/L. All other SP wells indicate either a geothermal, playa, and/or evapoconcentration signature and are therefore considered to be representative of natural background conditions for the immediate area.

To summarize, the shallow alluvial groundwater aquifer system is relatively complex displaying both geothermal and playa geochemical overprints. Despite this complexity, the monitoring data indicate that constituent concentrations potentially related to heap process solution, mercury, nitrate, and WAD cyanide, are declining and approaching background levels, the depths to groundwater have remained stable over time in all wells, and it no longer appears that there is a defined contaminant plume. Therefore, the Permit requires continued monitoring but no groundwater remediation at this time.

In January 2017, the Permittee's consultant, SRK Consulting, submitted an evaluation of the temporal and spatial trends for key parameters and an assessment of residual groundwater impacts in the area. The results of that evaluation indicated redundancy in the current monitoring network. Based on these recommendations, the Division eliminated monitoring requirements from the 2017 renewed WPCP for monitoring wells SP-18, SP-20, SP-21, SP-22, SP-26, SP-28, SP-29, and SP-31. Monitoring frequency for monitoring locations SB2, MW-1, MW-2, SP-17, SP-19, SP-23, SP-24, SP-25, SP-27, and SP-30 was reduced from quarterly to semi-annual.

Following review of the 2020 annual monitoring report submitted by the Permittee on 25 February 2021, the Division has decided to increase the monitoring frequency from semi-annual back to quarterly for monitoring locations SP-23, SP-24, and SP-25. There was a sharp increase in mercury to 0.27 mg/L seen at the Crofoot HLF draindown monitoring location in the fourth quarter of 2020. Additionally, there was a more elevated WAD cyanide in the draindown in the third quarter of 2020, 0.051 mg/L, but still below profile 1 RV of 0.2 mg/L. A spike of nitrate + nitrite, nitrogen in draindown to approximately 375 mg/L occurred in the second quarter of 2020.

Well SP-23 did not see an increase in mercury, and minimal increases in nitrate + nitrite nitrogen and WAD cyanide. Well SP-24 was below the detection limit and Profile 1 RV for mercury into 2021, nitrate + nitrite nitrogen and WAD cyanide continue to be well below Profile 1. The influence of HLF draindown is evident in well SP-25. Well SP-25 showed Profile 1 RV exceedances in mercury at 0.054 mg/L and nitrate at 35 mg/L in the third quarter of 2020 that persisted to the first quarter of 2021. WAD cyanide was below RVs at 0.030 mg/L in the third quarter of 2021 but did see an increase in the constituent.

With the EDC approved on 1 July 2021 that proposed using spent ore located on the HLF as blasthole stemming for work at Hycroft Mine Project (NEV0094114); this increased monitoring is to help observe any possible changes in groundwater quality relating to this work.

D. Procedures for Public Comment

The Notice of the Division's intent to issue a Permit authorizing the facility to construct, operate and close, subject to the conditions within the Permit, is being published on the Division website: https://ndep.nv.gov/posts/category/land. The Notice is being mailed to interested persons on the Bureau of Mining Regulation and Reclamation mailing list. Anyone wishing to comment on the proposed Permit can do so in writing within a period of 30 days following the date the public notice is posted to the Division website. The comment period can be extended at the discretion of the Administrator. All written comments received during the comment period will be retained and considered in the final determination.

A public hearing on the proposed determination can be requested by the applicant, any affected State or intrastate agency, or any interested agency, person or group of persons. The request must be filed within the comment period and must indicate the interest of the person filing the request and the reasons why a hearing is warranted.

Any public hearing determined by the Administrator to be held must be conducted in the geographical area of the proposed discharge or any other area the Administrator determines to be appropriate. All public hearings must be conducted in accordance with NAC 445A.403 through NAC 445A.406.

E. Proposed Determination

The Division has made the tentative determination to issue the renewed Permit.

F. Pathway to Final Closure and Permit Termination

Refer to WPC Permit NEV0060013, Parts I.B.1 through I.B.2 (Schedule of Compliance Items) and I.A.1 through I.A.3 (Permit Limitations) for specific details.

In accordance with NAC 445A.409 and 445A.446, for final closure and Permit termination the Permittee must demonstrate to the Division that: 1) all sources at the facility have been stabilized, removed, or mitigated; 2) any applicable requirements in NAC 445A.429, 445A.430, and 445A.431 have been achieved; and

3) sufficient post-closure monitoring has occurred to verify the adequacy of these actions to ensure the long-term protection of waters of the State, human health, and wildlife under the physical, chemical, and climatic conditions reasonably expected to occur at the site. If the facility includes a long-term trust and/or requires perpetual treatment or maintenance, post-closure monitoring may never be reached, and the Division may not be able to terminate the Permit.

The pathway to final closure and Permit termination at this facility includes the following specific actions:

- Submit the revised FPPC for the closure of the heap leach pad, which includes, but not limited to, the construction of an evaporation cell or wetlands, regrading of the heap leach facility, and improvements to the site stormwater controls;
- Complete approved permanent closure actions on the heap leach pad and associated facilities including placement of a cover system.
- Repair the heap leach channel collection system and remediate any possible contamination that may be found as a result of the channel evaluation (SOC I.B.2 2021 WPCP Rev 00);
- Stormwater pipes between Pad 1 and Pad 2 of the HLF must be removed, capped, and/or plugged.
- Submit a final closure report for the heap leach pad and ponds;
- Monitor the facility through all storms and large winter/spring storms to verify that closed components and the fluid management system remain functional with no potential for degradation of waters of the State;
- Discuss with the Division whether the facility is ready for final closure and Permit termination. If so, submit for review and approval a request for final closure and Permit termination including a demonstration of compliance with all applicable closure requirements (e.g., NAC 445A.379, 445A.409, 445A.424, 445A.429, 445A.430, 445A.431, 445A.446, 445A.447).

The Division may require additional actions if warranted in accordance with site conditions and applicable statutes, regulations, orders, and Permit conditions.

G. <u>Rationale for Permit Requirements</u>

The site is in closure. The Crofoot Heap Leach facility permanent closure activities began with the decommissioning of the refinery and associated facilities in 2009. Ongoing closure-related investigations and activities continue, and the results of these investigations may induce changes to existing and proposed FPPCs and Permit requirements.

The facility is located in an area where annual evaporation is greater than annual precipitation. Therefore, it must operate under a standard of performance which authorizes no discharge(s) except for those accumulations resulting from a storm event beyond that required by design for containment.

The primary method for identification of escaping process solution will be placed on required routine monitoring of leak detection systems as well as routinely sampling downgradient monitoring well(s). Specific monitoring requirements can be found in the Water Pollution Control Permit.

Facilities will be monitored and operated in accordance with the Permit conditions and the operating plans.

H. Federal Migratory Bird Treaty Act

Under the Federal Migratory Bird Treaty Act, 16 U.S. Code 701-718, it is unlawful to kill migratory birds without license or permit, and no permits are issued to take migratory birds using toxic ponds. The Federal list of migratory birds (50 Code of Federal Regulations 10, 15 April 1985) includes nearly every bird species found in the State of Nevada. The U.S. Fish and Wildlife Service (the Service) is authorized to enforce the prevention of migratory bird mortalities at ponds and tailings impoundments. Compliance with State permits may not be adequate to ensure protection of migratory birds for compliance with provisions of Federal statutes to protect wildlife.

Open waters attract migratory waterfowl and other avian species. High mortality rates of birds have resulted from contact with toxic ponds at operations utilizing toxic substances. The Service is aware of two approaches that are available to prevent migratory bird mortality: 1) physical isolation of toxic water bodies through barriers (e.g., by covering with netting), and 2) chemical detoxification. These approaches may be facilitated by minimizing the extent of the toxic water. Methods which attempt to make uncovered ponds unattractive to wildlife are not always effective. Contact the U.S. Fish and Wildlife Service at 1340 Financial Boulevard, Suite 234, Reno, Nevada 89502-7147, (775) 861-6300, for additional information.

Prepared by: Amanda E Tate
Date: 28 October 2021

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